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Exploring the Experiences and Perceptions of 21st Century Leadership Academy Participants

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ABSTRACT

The *21st Century Leadership Academy* grew out of an effort by the Council of Technology Teacher Education's (CTTE) Leadership Development Committee to prepare future leaders for the field of Technology & Engineering Education (TEE). Efforts by Drs. Roger Hill (University of Georgia) and Bill Havice (Clemson University) led to the creation, and subsequent implementation, of this leadership academy with support from CTTE (later renamed the Council on Technology & Engineering Teacher Education [CTETE]) and the International Technology & Engineering Education Association (ITEEA). Initially, participation in the leadership academy was focused on early-career university faculty but recruitment was later expanded to include individuals with related professional experience (e.g., graduate students, tenured faculty members, etc.) and, as of January 2021, more than 80 individuals have participated in the academy. This study reports an investigation into the experiences and perceptions of the academy alums with an additional focus on their professional involvement, how participation may have influenced these activities, and suggestions they had for future cohorts. In addition, our investigation provides suggestions for future similar leadership training efforts that could be applied in a variety of fields. Our efforts, as researchers, aim to present the shared experience as navigated by the cohort participants. Although individual takeaways vary, overall themes such as networking and collaboration underscore the experience of participants in each cohort year. While participants consider themselves active in the field of Technology & Engineering Education, few of them are serving in leadership roles within CTETE or ITEEA.

Keywords: Technology and Engineering Education, STEM Education, Professional Development

Technology & Engineering Education (TEE) has a long and somewhat-complicated history (Herschbach, 2009). Rising out of manual arts and then industrial arts, technology education gave way to TEE in the early 2000s (Reed & LaPorte, 2015). Today TEE actively contends for a place

in Science, Technology, Engineering, and Mathematics (STEM) education and positions itself as an important part of general education aimed at ensuring a technological and engineering literate society (Daugherty, Carter, & Sumner, 2021). The recent release of *Standards for Technological and Engineering Literacy* (ITEEA, 2021a) represents the latest in these efforts to integrate TEE within the larger STEM community.

Inherent to and undergirding these efforts is the professional development of TEE professionals, critical to the overall success of TEE as a profession and career pathway for young professionals entering the workforce. These professional development efforts include work with TEE teachers, researchers, administrators, and teacher-educators. Despite shrinking numbers in TEE over the past few decades (Moye, 2017), recent successes (e.g., the recently released STEL) suggest a continued role for TEE in STEM and general education. However, for TEE to remain a strong and vibrant profession, leaders who can embrace the ever-changing educational landscape and tackle the unknown are clearly needed but must be encouraged.

This need for leadership development within the TEE community was formally recognized by the CTTE leadership development community in the early 2000s. Recognizing the need to develop leaders, Drs. Bill Havice and Roger Hill submitted a funding proposal for the 21st Century Leadership Academy (21stCLA). This initiative has since involved more than 80 TEE professionals, with participants ranging from classroom teachers to university administrators. While the activities of the participants have evolved over the years, the core goal of preparing future leaders for the field has remained.

Statement of the Problem

Although the 21stCLA has been in place for 15 years, a systematic investigation of the alignment between the stated goals of the academy and participant outcomes has not been conducted. Out of consideration for the efforts of Drs. Havice and Hill, and all those involved over the years with the 21stCLA, an understanding of the impact this initiative has had is needed. Further, the sizable financial investment into this initiative by both the CTTE, and later the CTETE, and the International Technology and Engineering Educators Association (ITEEA) points toward the need for an increased understanding of the impact of the 21stCLA and the perceptions of participants.

Research Aim

To investigate how the 21stCLA has impacted the participants, as well as exploring the extent to which the stated aim has been achieved, we surveyed 21stCLA participants from the 15 years (2006-2021) of the program's existence. Further, we interviewed the founding directors (Drs. Havice and Hill) to explore the history of this initiative and better understand the efforts, changes, and aims of the 21stCLA over the years. These approaches align with our stated research aim to explore the experience(s) and perception(s) of 21stCLA alumni. We believe the findings gleaned through this effort may serve useful in shaping the 21stCLA moving forward and as a check into the impact of the initiative thus far. Further, findings from this effort may be useful for similar leadership initiatives across a wide range of fields and professions.

ITEEA & CTTE/CTETE

To understand the 21stCLA, it is important to understand the professional organization, and associated groups, which support, strengthen, fund, and carry out the 21stCLA. The International

Technology & Engineering Education Association (ITEEA) and the Council on Technology and Engineering Teacher Education (CTETE) – a council within ITEEA – are the two main organizations supporting the 21stCLA. ITEEA is a professional organization with a long and valued history in the fields associated with TEE and has the following stated mission (ITEEA, 2021b) to:

advance technological and engineering capabilities for all people and to nurture and promote the professionalism of those engaged in these pursuits. ITEEA seeks to meet the professional needs and interests of members as well as to improve public understanding of technology, innovation, design, and engineering education and its contributions.

To this end, ITEEA has played a pivotal role in supporting TEE curriculum in public schools while also helping prepare the next generation of TEE professionals and serving to align the efforts of many people engaged in TEE around a common set of goals and principles. This is evident not only in the produced educational standards, but also in the variety of committees, professional projects, research, and published articles produced by, and/or shared through, ITEEA.

Professional organizations, such as ITEEA, have traditionally been seen as a source for professional growth and other opportunities. Initiatives such as teacher professional development, educational standards, the organization of conferences or forums, and even political campaigns all stem from professional organization efforts (Phillips & Leahy, 2012, Ritz & Martin, 2013). Hanson (1983) argued for such benefits that professional organizations offer – with a specific note to that of “community.” A professional community can facilitate open discourse among participants, the exchange knowledge, direct contact with leaders in the field, and an overall strength in number (potential political power) (Hanson, 1983). ITEEA’s professional efforts, opportunities (e.g., committee, task forces, etc.) have spanned a variety of initiatives and recent projects have included, but are not limited to, the following (ITEEA, 2021b; Reeve, 1999):

- Foundation for Technology Education (FTE)
- Council on Technology and Engineering Teacher Education (CTETE)
- Council for Supervision and Leadership (CSL)
- Elementary STEM Council (ESC)
- Technology and Engineering Education Collegiate Association (TEECA)
- International Conference on Technology Education (ICTE)
- Pupils Attitudes Toward Technology (PATT)
- STEM Center for Teaching and Learning (STEM CTL)

Further, ITEEA has also collaborated with other professional organizations to embrace the prevalence of the field associated with TEE and to best support its organizational members. Those organizations include, but are not limited to:

- American Association for the Advancement of Science (AAAS)
- Association for Career and Technical Education (ACTE)
- Association for Educational Communications and Technology (AECT)
- American Society for Engineering Education (ASEE)
- Association of Supervision and Curriculum Development (ASCD)
- Association of Technology, Management, and Applied Engineering (ATMAE)
- National Science Teachers Association (NSTA)
- Society of Manufacturing Engineers (SME)

As a group within ITEEA, the Council on Technology and Engineering Teacher Education (CTETE) is one of the many councils associated with the ITEEA. Formed in 1950, today's Council on Technology and Engineering Teacher Education (CTETE) was initially called The American Council on Industrial Arts Teacher Education (ACIATE) and later (1986) renamed the Council for Technology Teacher Education (CTTE). Then, in 2012, the organization was once again renamed Council on Technology & Engineering Teacher Education (CTETE). Regardless of name changes, the overall mission of the organization has been to aid in teacher preparation and teacher preparation programs for TEE. CTETE's goals include supporting excellence in technology and engineering teacher education and stimulating research in areas of interest to the profession (CTETE, 2021a). The CTETE has been pivotal in providing focused research opportunities and publications for teacher educators (e.g., yearbooks) and has been a primary editing/review body for the Journal of Technology Education - the premiere peer-reviewed publication for the TEE profession (CTETE, 2021c).

The CTETE structure consists of committees that address concerns/interests of the membership and the community and, as one of these committees, the CTETE's Leadership Development Committee specifically sought to engage young professionals by providing resources to (1) assist professional in succeeding in Technology and Engineering Education, (2) revitalize active and professional research and scholarship, and (3) build a future for the profession (CTETE, 2021b). The 21stCLA specifically represents a funded proposal stemming from the CTETE Leadership Development members to build community and professional development amongst early-career TEE faculty. The program was developed to "facilitate a sense of community and provide activities and resources to support scholarly and professional development opportunities for groups of early career technology education faculty" (Havice & Hill, 2012, para. 1).

The 21st Century Leadership Academy

The 21stCLA began at a strategic planning meeting by leaders of the CTTE at the 2006 ITEEA conference. Drs. Havice and Hill, leaders of the Leadership Development Subcommittee, developed a proposal for a professional development program for young professionals centered on future service and leadership in the profession. The 21stCLA began in 2007 with the following vision which has evolved over the years to reflect technological advances and program evolution (ITEEA, 2021c):

This program is providing an opportunity for rising technology and engineering educators from across the country to develop as professional leaders, develop community, and have experiences related to the promotion of technology and engineering education and technological literacy in our schools. Furthermore, the best of practices are being shared throughout different regions of the country via the media technology established in the course of this year long program.

Havice and Hill determined to hold the academy yearly with a group of young professionals engaging in a series of activities, training, and experiences aimed at providing valuable leadership experience and instruction. Each month, a professional within the ITEEA membership would present on a current topic for approximately one hour followed by thirty minutes of discussion. Further, Havice and Hill decided upon a cohort of six members to ensure a setting conducive to discussion, mentoring, and individual accountability. This decision has continued throughout, and the yearly cohort size remains at six to date. Following the initial cohort, which represented a "trial

phase” for different activities, lessons, and discussions, additional refinements were made (D. Lecorchick, personal communication, December 2, 2020).

One of the most significant additions to the program was a group trip to Washington D.C.; this was added to the agenda for cohort members in addition to the presentations, discussions, and other instruction. This trip, commonly referred to as “the D.C. Experience,” was added to provide cohort members an opportunity to spend time meeting with several prominent leaders of the field (TEE) and other closely associated fields. Over the years “the D.C. experience” meetings have varied and have included visits to ITEEA, American Society for Engineering Education (ASEE), National Science Foundation (NSF), and National Academy of Engineering (NAE). Inherent in these D.C. trips was the charge to expand participants’ understanding of leadership within the technology and engineering education profession, facilitate contacts and collaboration, and engender leadership traits and qualities in cohort members.

At the onset, the initial aim of the 21stCLA (ITEEA, 2021c) was to reach, guide, and grow leaders who were early faculty members at colleges/universities or doctoral students preparing for those roles. This emphasis was seen in the cohort members from the initial years of the program which largely consisted of faculty in TEE programs at 4-year universities. However, this focus was broadened in 2010 when ITEEA directed funding from the Foundation for Technology Education Gerrish funds to support 21stCLA activities. These funds provided additional, and needed, support and also resulted in the program being expanded to include an option for participation by any TEE faculty, K-12 practitioners, and/or administrator (ITEEA, 2021c).

Another development occurred in 2013 when an ITEEA member asked for a regular session at the annual ITEEA conference where 21stCLA alumni could meet and discuss their current research agendas and fellowship with one another. This session was first held in 2014 and has occurred each year since. Further additions to the 21stCLA program have included the expansion of cohort member participation with mid-to-late career professionals and the organization of a yearly research project to be completed by cohort members. These research projects, which are not required but have been strongly recommended, typically begin with the initial cohort meeting (at the ITEEA annual conference) and culminate in a presentation at the following ITEEA conference (D. Lecorchick, personal communication, December 2, 2020). Another adjustment came in 2020 when Havice retired from being a co-director of the academy; his successor is Dr. Douglas Lecorchick, who joined Hill in leading the 21stCLA.

Methods

In line with our stated research objective, this project used multiple approaches to collect data and explore the 21stCLA. The two primary methods used were surveys and interviews. Interviews were conducted with the founding professors of the 21stCLA (Havice and Hill) to better understand the intent of their actions and modifications of the 21stCLA including the input from the CTETE Leadership Development Committee and the CTETE Executive Committee throughout the years. These interviews followed a semi-structured approach (Berg, 2004) where questions were asked about the leadership program including the why, when, how, personal impressions, and so forth. The interview began with an overarching and general question of “Could you speak to how this academy began?” and probing questions followed. In each instance, the interviewer was able to ask follow-up questions to ensure understanding and elicit additional responses for different topics. The results from these interviews are included in the description of the program recounted previously, as well as the discussion section of this piece.

The second step in our inquiry involved the design, development, and deployment of a survey for alumni. The survey was created by the four primary researchers of this project. To create the survey, survey questions were proposed by each of the four contributing researchers (three of which are 21stCLA alumni), and then individually evaluated and assessed by each researcher. When a consensus among the four researchers was reached on the most appropriate questions to ask, those questions were included in a final survey. The researchers used face validity as the primary survey construct where research consensus is typical of this type of research and survey design. Although a construct and content validity methodology may have proved helpful, because the research aim was broad and wasn't aimed at measuring one specific construct, both construct and content validity were not emphasized in this research design (Sireci, 1998). The survey was digitized and created in Qualtrics© to facilitate administration purposes. Although no formal pilot of the survey was administered, each of the researchers took the survey to verify survey function, flow, and accuracy (i.e., if the survey questions addressed the research aim). The researchers then met and discussed any needed changes and came to a consensus prior to finalizing the survey. Once the survey was finalized, the survey was sent through email to each 21stCLA alumni based on their contact that was listed with 21stCLA. However, if alumni had changed email or positions where we did not have contact, they did not receive the survey link. Accordingly, if no response was received, the researchers used LinkedIn© and various searches (e.g., personal contacts, Google©) to verify if positions had changed and to try to identify current contact information. In total the researchers were able to identify contact information for 73 of the 86 total participants.

After making these attempts at identifying contact for each participant, all surveys were sent out via email to the 73 participants with confirmed contact information. Each participant was provided a unique link to access the survey and given one week to respond. Following the first week, all non-responding alumni were emailed and/or called, and then provided an additional week to respond to the survey. Following this second round, additional contact (email or phone call) was made to each non-responding participant and one additional week was provided to respond. These efforts resulted in 62 survey respondents out of 73 alumni contacted (85% response rate) (out of 86 total alumni). Although we recognize the data may be biased (e.g., based on people who responded, three of which are authors on this paper) or incomplete (13 of the 86 total participants were not contacted due to outdated contact information), we were unable to otherwise control for this and the associated findings should be taken in light of this limitation.

Following the receipt of all survey responses, all data was collected and aggregated. Data conditioning was performed to remove incomplete entries and facilitate analysis. All data was analyzed to identify emergent themes (Given, 2008) using suggestions by Saldana (2016) for thematic coding. In each instance the responses were reviewed by the researchers, themes identified, and then responses were checked against the identified themes.

Findings

The purpose of the 21stCLA is to build leaders within the field of Technology and Engineering Education. The survey was designed to explore the experiences of participants and explore whether 21stCLA participants have become leaders within the field (TEE) on a national level, i.e., serving in positions or on committees associated to the sponsoring organizations of the field, namely ITEEA and CTETE. The general findings suggest that most participants feel they are active in the field (i.e., attend conferences related to the field), however, their lack of leadership on committees

associated to the sponsoring organizations led us to wonder “what does it mean to be a leader in the field”, and if 21stCLA is helping people to be leaders in the field. The data below highlights our efforts to investigate people’s experiences with 21stCLA to understand what may have helped or hindered their investment to becoming a leader in the field. We believe the data provides some insight into a potential disconnect, namely people may feel active within the organization, however, they do not serve in leadership roles. Further research needs to investigate what it means to be “active” in the field – and provide a case for what it means to be “active” outside of professional sponsoring organizations. Notwithstanding that limitation, the findings presented and discussed below do provide an interesting lens to consider whether investing money and time to expose and train people will lead them to a more active role within the field.

Demographics and Highlights. The initial questions of our survey were used to obtain basic demographic information from the participants. At the time of this survey, the majority of 21stCLA participants were employed in higher education (35/58) while others were employed in state, district, or local education positions (16/58) and the remaining were working in a variety of other positions or were retired (7/58). This data point establishes as baseline comparison, where most past participants are in education related positions. This is important because initial acceptance into the 21stCLA required that the participants be in education related positions. Because nearly 88% of the participants are still in education fields, we felt that our initial investigation into what the participants are currently doing, and if they are leaders in the field, was worth pursuing.

To start our investigation, we wanted to first understand why the participants wanted to be part of the 21stCLA. The survey question about the application process showed that most participants were nominated (88%, 52/59) for the 21stCLA. Further, nearly all the alumni shared that they believed that participation in the 21st CLA was recommended to them to help them with “networking and professional development opportunities within the field”. Upon further investigation we found that most of the nominations were received from university mentors. Although we can’t be certain what it means that majority of participants were recommended by their university mentors, in talking with several of these university mentors we learned that they believed the program would help introduce and connect the participants to the field, which could potentially lead them into a more active role in the profession through networking and understanding of the profession. This finding was further investigated when 21st CLA participants were asked “Why did you choose to participate in the 21st CLA?” Alumni answers contained references to multiple topics and ideas. Each reference was counted individually (resulting in more total references than survey responses), and all were then tallied. The final themes for “why” alumni participated included four main ideas: 1) networking (30%, 25/83), professional development (27%, 22/83), a feeling of obligation (e.g., because they were nominated) (25%, 20/83), and/or leadership skill development (16/83, 19%). Comments from participants included ideas such as:

I wanted an experience to hear from other leaders in the field whom I did not get a chance to hear from other ways.

Being able to hear from Mark Sanders about the history of I-STEM, and Bill Dugger [sic] about the creation of the STL are just two examples of things that I will forever remember and helped shape my work and leadership as I moved into

academia. I also wanted the opportunity to work with others from various universities.

The cohort itself was appealing because it allowed me to work with others who had diverse backgrounds but had similar interests, and continue working with them on projects beyond the 21st CLA. My graduate advisor also highly recommended I apply so that helped too. Dr. Havice and Dr. Hill were great to work with and I learned a lot from their leadership.

Alumni were also asked to recount the experiences they remembered from participation and to identify the “highlight” of their participation in the 21stCLA. The reason this question was asked was to understand what were the potential items that could have excited and or taught participants about the profession. Responses included the welcome dinner/event, monthly meetings, networking and collaborating on group projects, and various activities included in the “D.C. experience.” The most referenced event was “the D.C. experience”. One participant remarked:

My favorite experience was traveling to Washington, DC for the two-day meeting where I had the opportunity to network with national/international organizations such as the National Academy of Engineering, National Science Foundation, and International Technology and Engineering Educators Association. I also was very pleased with the monthly meetings and being able to publish a paper with some of the other 21st CLA members.

According to the directors of the 21stCLA and participants, two pillars of the 21stCLA are the monthly online sessions and the trip to Washington D.C. (“the D.C. Experience”). The respondents of this survey indicated that their overall satisfaction with the monthly sessions was predominantly positive with forty-one out of fifty-eight (70.7%, 41/58) of participants rating the monthly session “somewhat effective” or “very effective”.

Forty-six of fifty-seven (80.7%, 46/57) participants selected ‘yes’ to the question “Do you remember having a Washington D.C. experience as part of your 21stCLA participation?”. The reason 11 respondents did not respond yes is likely because the DC experience did not occur twice. It was added after the first year, and then in a later year, there was insufficient funding to include it for that one year. Drs. Havice and Hill confirmed this – sharing that “the D.C. experience began during the second cohort class, and then another year it was canceled because there was insufficient funding for the experience”. Out of the respondents who did have the opportunity for “the D.C. Experience,” all rated the trip between “somewhat effective” to “very effective” with the majority (88.1%, 37/42) giving this experience the highest satisfaction rating of 5 - very effective.

The DC experience is obviously a memorable event, however, despite participants listing those items they remembered and or felt were helpful because they taught them about the profession, none of the participants reported that the DC Experience outside of being interesting and fun, helped them towards a leadership position within the field. Although in talking with the primary organizers of the 21stCLA they did not state that it was a specific goal of the DC experience, they did share they hoped that the DC experience would further endear participants to the field and would thereby encourage more active participation in the field. While this could

occur, our data is inconclusive if that did or did not happen. Our data simply states that the DC experience was the most memorable part of the 21stCLA because it was (in the words of a participant) “interesting to visit the headquarters of the organizations in the field and meet with the people who work there.” Similarly, the other events that participants recalled from the 21stCLA, namely monthly meetings, appear to have taught participants about the field, but not necessarily encourage participation in the field outside of normal membership in the professional organizations. We surmise that if the monthly meetings had more explicitly invited participants to be leaders in the field on a national level, and provided them rationale, and a “how to” guide to get involved, that more participants may have sought that type of active leadership.

Professional Progression. Survey items sixteen through twenty were centered on the professional progression of the academy participants. The majority of those responding to the survey indicated that they were at the professorial level (39.6%, 21/53) at the time of participation (see Figure 1). This was followed by classroom teachers (28.3%, 15/53), other professionals (17%, 9/53), and graduate students (15%, 8/53); with only four individuals indicated on the survey that (at the time of their participation) they were not directly associated with the field of Technology and Engineering Education (7%, 4/57). This was an important question to ask because it helped establish a baseline of where participants were at the time of participation the 21stCLA, compared with where they currently find themselves.

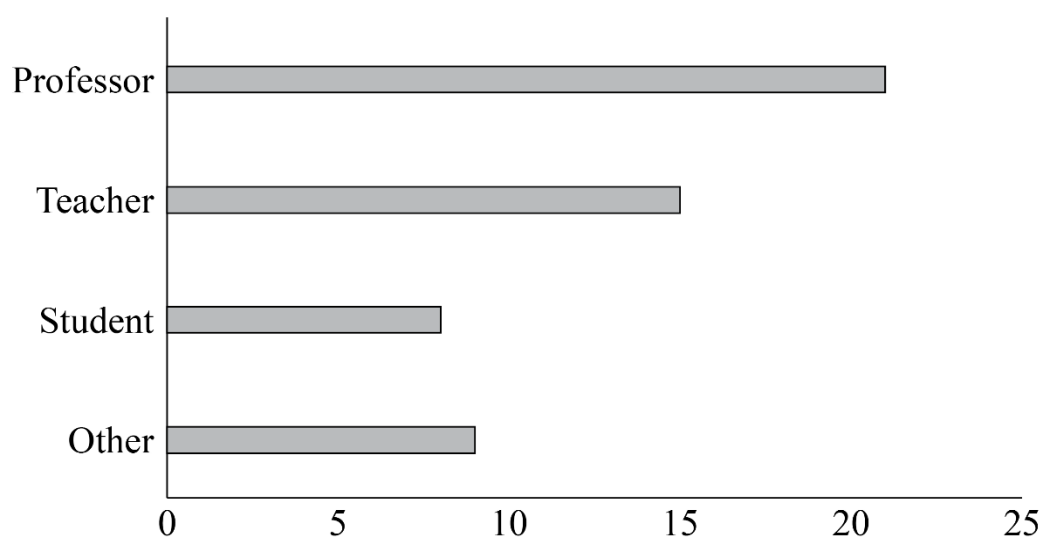


Figure 1. 21stCLA alumni position at the time of participation

Interestingly, following the 21stCLA experience, many of the participants changed positions. Out of the fifty-seven respondents for this question, thirty-five indicated a change in position (61.4%, 35/57) between the time of their participation in the academy and the survey. A closer review of the responses revealed that twenty of the participants who indicated a change in position are now in leadership roles (Directors, Deans, or Coordinators in school districts or universities; 57.1%, 20/35). An additional ten participants (28.6%, 10/35) indicated professional promotions (e.g., from assistant to associate professor), though not specifically into leadership positions. Though this information appears to present positive implications regarding the 21stCLA, more comparative data would need to be collected to establish a causal relationship. The

retention rates of similar non-participating professionals would be a potential field of comparison for future research.

The Goals and Mission. Responses from cohort alumni indicated they were aware of the goals and mission of the 21stCLA (ITEEA, 2021c), with forty-seven out of fifty-two (90.3%, 47/52) participants stating those goals were met during their time in the academy. When asked “What benefit(s) do you see from participating in the 21CLA?,” the majority of responses (58.9%, 33/56) included networking, and, when asked about current networking strategies, thirty-seven out of fifty-seven (64.9%, 37/57) participants noted that they continue to keep in contact with members of their cohort.

Connection to Technology & Engineering Education. The latter part of the survey investigated professional connections to TEE as a field (e.g., “What was your commitment to the field prior to and following participation in the 21CLA experience?”). The final questions on the survey explicitly asked whether the participants were “active” in the field; of the 57 respondents, 48 (84%) said they were still “active”. Although the definitions of “active” most likely vary among TEE professionals the survey results suggest that “active” is defined as: participation in professional organizations connected to TEE such as ITEEA, CTETE, Technology & Engineering Collegiate Association (TEECA), ASEE, and others that the field is commonly associated with (e.g., Pupils Attitudes Toward Technology, PATT). Those that reported no longer being connected to the field stated their reasons as: received a new position not connected to the field ($n = 2$), change of career focus ($n = 5$), and new position is too broad to stay connected ($n = 2$).

Our survey further investigated the idea of being “active” and “connected” to the field by asking participants about their connection to the field’s national sponsoring organization: ITEEA (which is also a sponsoring organization for the 21st CLA). Although the majority said they hold ITEEA membership (83%), only 46% said they serve on or participate on ITEEA committees or affiliate councils such as CTETE, TEECA, etc. This phenomenon needs to be further investigated – why such a low percentage, what level of activity is considered “active” by participants, and where are efforts currently being focused if not in ITEEA activities, events, or efforts? Although we surmise this finding may indicate a lack of knowledge of how to be involved, we are not confident in this guess and instead posit that this may be an area where the 21stCLA could improve. For example, 21stCLA could include a general overview of the ITEEA structure and ways for participants to get and stay involved.

A final phenomenon that was found in the survey data was that most participants stated that their commitment to the field went up after participating in the CLA - regardless of if they found themselves in a position connected to the field or not. A potential reason for this finding is that an enhanced commitment is a result of the community built among the cohort members during the year. It also reinforces the idea that when members of a professional organization interact as a team they identify more closely with the aims and goals of that professional organization (McLean & Akdere, 2015).

Discussion and Conclusion

We set out to explore the experience of 21stCLA alumni with a specific emphasis on how their experience may or may not have aligned with the stated aims of the program. The first and foremost aim of the program is to develop professional leaders. Our analysis of the collected data, although not conclusive, suggests that the program has been successful with many participants

currently acting in leadership roles and participants responses affirming this perception as well. However, it may be reasonably suggested that “leadership” and “active participation” in the field could mean serving on committee and council responsibilities within ITEEA, CTETE, or in other related fields/organizations. Given the low number of respondents reporting committee/council responsibilities (in or outside of those listed above) (46%, 26/56), some might alternatively argue that the program has not been successful in all regards. Additional research is needed to fully understand this disconnect, i.e., Why are 21stCLA participants continuing to rate themselves as “active” in TEE (84%, 47/56) but not filling leadership and committee assignments?

The second noted aim of the 21stCLA is to “develop community” (ITEEA, 2021c). Our exploratory qualitative analysis of the survey responses suggests that this aim has been met. Many responses to the survey suggested that networking and community were two of the greatest benefits of participation in the 21stCLA. Further, we noted the high response rate to our inquiries for survey participants (72%, (62/86) of all alumni responded to the survey) as a sign of a continuing sense of “community” and connection to the 21stCLA among the alumni.

The third aim of the 21stCLA is to provide “experiences related to technology and engineering education and technological literacy in our schools” (ITEEA, 2021c). Activities related to this aim were clearly listed (e.g., the monthly meetings and other trainings were noted and rated highly in the survey) with the most impactful aspect of the 21stCLA being “the D.C. experience.” Alumni repeatedly cited the impact of this experience on their professional growth and, with only a few exceptions, almost all of the 21stCLA participants have experienced this opportunity and noted the benefits. As one participant put it:

The DC trip was the biggest highlight, although both ITEEA conferences were important. There is nothing that can beat face to face communication. When talking and learning about leadership and how to build leadership in a community, being in the capital of the US, where the leaders of our nation live, it just makes the entire experience more applicable.

The last aim noted was to share “best practices”. There is some discretion here in terms of assessing how well this aim was met because what constitutes a “best practice” for leadership in TEE is debatable. If “best practices” entails leadership in ITEEA/CTETE committees or councils, it appears that there is room for improvement as a surprisingly low number of academy participants are serving in ITEEA or CTETE (26/57, 46% - as indicated previously). The reason for this low number is not directly identified, but, based upon other data collected, it could be correlated with other conference participation and/or current position requirements focusing on more local events (i.e. state level). Further investigation into these items may help guide future endeavors of the academy as well as identify current trends in the field that may better shape professional and leadership development strategies.

Conversely, if best practices were viewed more broadly to include skills such as publishing, teaching, and mentoring, the overall impact of the 21stCLA may have been greater. Further, its important to note that the impacts of the 21stCLA may extend into other fields and thus not be fully demonstrated on our survey. While a high number of 21stCLA members did move “up” into leadership positions following their participation, many of these were locally focused (e.g., state, district, etc.) rather than nationally and, after reviewing the data, several other professional organizations and conferences were identified by academy participants as areas where they were invested. When questioned, several indicated that their participation in these other organizations

varied, but included networking, professional development, and trends in the field (depending on their current position). This presents a few additional items for further discussion and investigation.

When the respondents were asked to provide advice for future cohorts, six common areas of suggested improvements were identified:

1. Having a reunion or ongoing recognition for alumni during the ITEEA conference each year.
2. Selecting a more diverse cohort including elementary school teachers and international participants.
3. Including more face-to-face meetings and activities.
4. Asking alumni to mentor and present to current cohort members.
5. Discuss with the current cohort what topics they would like to hear about during the monthly sessions.
6. Solve a common problem through researching a topic together as a cohort.

These suggestions outline potential action items for the directors of the academy to discuss as the program continues to evolve as well as important considerations for those involved with other leadership development initiatives. In 2020-2021, suggestions 5 and 6 were implemented with the cohort of participants as these cohort members, working under the guidance of the academy's co-directors, collaborated on a research topic involving identifying contemporary trends of online teaching within TEE. Their research will be presented at the ITEEA conference and will also be represented in a refereed journal article submission, a first for most of the participants.

The impact of the 21stCLA has been significant in many ways. We believe that there are many positive takeaways from the 21stCLA and we applaud the efforts of all involved – especially Drs. Havice and Hill. In addition to recognition of these positive impacts, additional areas of future research have been discussed. Perhaps most importantly, why are alumni of the program continuing to rate themselves as “active” in TEE (84%, 47/56) but not filling leadership and committee assignments (26/57, 46%)? Where are the efforts of alumni being spent and how might the 21stCLA be shaped to be more effective? How do non-participating professionals in the field compare to the 21stCLA cohort? The committee will continue to investigate these items as the research and the 21stCLA continue supporting future leadership development in the TEE community.

In summary, after reviewing the data from our research, it appears that the 21stCLA has provided a beneficial experience to many. However, the effectiveness of the 21stCLA in meeting its stated goals to develop leaders, is unclear. Specifically, if the goal of the 21stCLA is to prepare leaders for the field of TEE, what does that mean? Are there expectations that “leaders” will serve and lead committees? Are there other expectations for “leaders” and, if so, how are these defined, by whom, and for what purpose? If the 21stCLA is to become a “win-win” for all involved--both those funding and those participating--it appears that additional work is needed to ensure the maximum return on investment and perhaps clarify the expectations following participation.

References

- Berg, B.L. (2004) *Qualitative Research Methods for the Social Sciences*. 5th Edition, Pearson Education, Boston.
- Council on Technology & Engineering Teacher Education (2021a). *About, History*. Retrieved from ctete.org/about/ on February 3rd, 2021.
- Council on Technology & Engineering Teacher Education (2021b). *Committees/CTETE Committees*. Retrieved from ctete.org/contact/ on February 3rd, 2021.
- Council on Technology & Engineering Teacher Education (2021c). *Publications*. Retrieved from ctete.org/publications/ on February 3rd, 2021.
- Daugherty, M., Carter, V., & Sumner, A. (2021). Standards for Technological and Engineering Literacy and STEM Education. *Technology and engineering teacher*, 80(5).
- Given, L. (2008). *The SAGE Encyclopedia of Qualitative Research Methods*. DOI: <https://dx.doi.org/10.4135/9781412963909>.
- Hanson, R. (1983). Gaining and maintaining professionalism, In R.E. Wenig and J. I. Matthews (Eds.) *The dynamics of creative leadership for industrial arts education*, 32nd ACIATE yearbook. Bloomington, IL: McKnight Publishing Company.
- Havice, W., & Hill, R. (2012). *Foundation for technology and engineering education, international technology and engineering educators association, and council on technology teacher education 21st century leadership academy*. Retrieved from: <http://www.iteea.org/Membership/21CenturyLeaders/LeadershipAcademyApplication2014.pdf>
- Herschbach, D.R. (2009). *Technology education foundations and perspectives*. Homewood, IL: American Technical Publishers.
- International Technology and Engineering Educators Association. (2021a). *Standards for technological literacy revision project: Background, rationale and structure*. Reston, VA: Author.
- International Technology Education Association. (2021b). <https://www.iteea.org/>.
- International Technology Education Association. (2021c). *21st Century Leadership Academy*. Retrieved on February 10, 2021 from: <https://www.iteea.org/Activities/AwardsScholarships/Awards/Twenty-FirstCenturyLeadershipAcademy.aspx>
- McLean, G. N., & Akdere, M. (2015). Enriching HRD Education Through Professional Organizations. *Advances in Developing Human Resources*, 17(2), 239–261. <https://doi.org/10.1177/1523422315572650>
- Moye, J. J. (2017). The supply and demand of technology and engineering teachers in the United States: Who knows? *Technology and Engineering Teacher*, 76(4), 32-37.
- Phillips, B. N., & Leahy, M. J. (2012). Prediction of membership in rehabilitation counseling professional associations. *Rehabilitation Counseling Bulletin*, 55 (4), 207-218.
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- Reed, P. A., & LaPorte, J. E. (2015). A content analysis of AIAA/ITEA/ITEEA conference special interest sessions: 1978-2014. *Journal of Technology Education, 26*(3).
- Reeve, E. M. (1999). *Professional associations, organizations & other growth opportunities*. In A. F. Gilberti & D. L. Rouch, *Advancing professionalism in technology education* (pp. 69-96). New York: Glencoe McGraw-Hill.
- Ritz, J., & Martin, G. (2013). Perceptions of new doctoral graduates on the future of the profession. *Journal of Technology Studies, 39*(2)
- Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). London, England: SAGE.
- Sireci, S.G. The Construct of Content Validity. *Social Indicators Research 45*, 83–117 (1998).
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